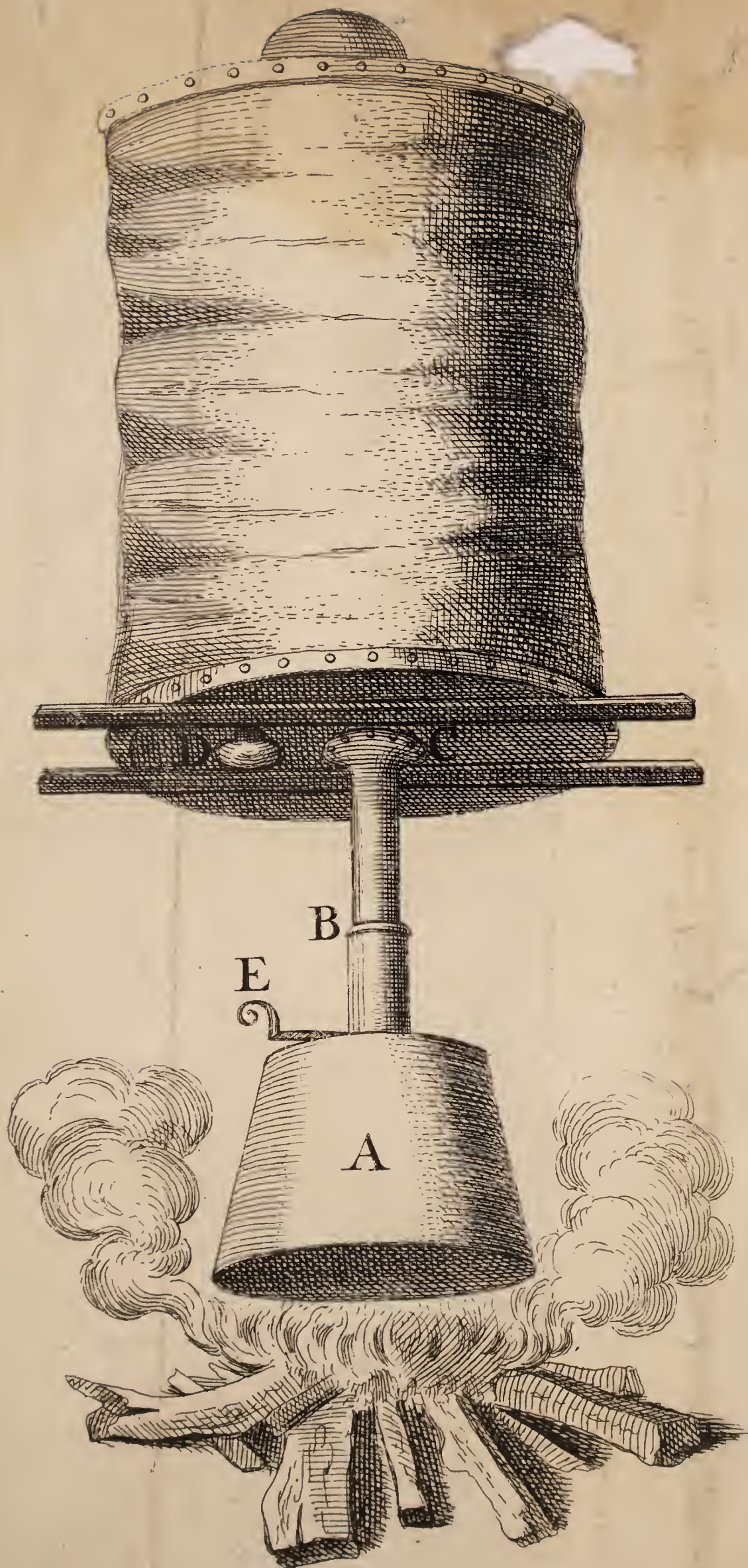


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THEORY OF THE WINDS,

Shewing by a

New *HYPOTHESIS*,

THE

PHYSICAL CAUSES

Of all WINDS in General:

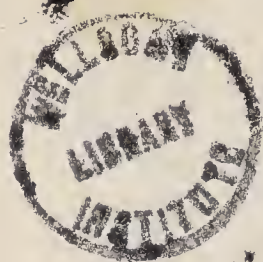
With the Solution of all the VARIETY and
PHÆNOMENA thereof,

As it was read to the ROYAL SOCIETY.

By *BERNARD ANNELT*.

L O N D O N:

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T H E
P R E F A C E.

THIS Discourse was drawn up with an Intent only to be laid before the Royal Society; but being finished, I found myself under a necessity to abridge it in a great Measure, to suit the Convenience of that Purpose; by which I omitted some considerable Arguments and Illustrations. Reflecting then on the Importance of the Disquisition, and that an Attempt of this Nature must carry the fullest and most confirming Instances

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to support it, I saw no other way but to publish the compleat Essay.

*The Aim and Design here pursued, is to prove, that upon Vapours depend the Causes of Winds in common: It will, I presume, be far from being understood, that all the Motions of the Air that are known, must proceed from the same Principle: For as Air is a yielding Body it may be impressed by innumerable Modes of Actions. The flowing of the Sea we are well assured is made by the Attraction of the Sun and Moon, but we cannot say there are no Motions therein but what are derived from the same Source, nor that those Bodies are the only Agents capable of elevating the Waters: For was it thus, we should not see the Tides transgress
their*

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their Theory at any great Wind, by exceeding their proper Height when its Course is in Concurrence with them, or be abundantly depressed by the Opposition thereof.

There are many Eruptions of Air from Caverns, Pits and Volcano's remarked by Naturalists, and likewise some constant and intermitting Breezes which revolve in regular Times, all which it is likely are to be accounted for by peculiar Causes: Nor would I say, that Heat, which I have taken Notice of in the beginning of this Tract, can have no Effect at all in disturbing the Atmosphere: For I am sensible, that Air is thereby contracted, or rather, that it loses part of its Elasticity, whereby it is pressed into a narrower Compass by that which retains its full

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full Spring, which must have a Motion as the warmed Air gives way. This is confirmed by many Instances, particularly by a Tube whose End is immersed in Water, and the other closed; if the Air therein be warmed, by putting a Heat near it, or by any other means, the Water will immediately rise therein; it must therefore be deprived of Part of that Elasticity which before, with an equal Force, resisted the Pressure of the external Air on the Water.

This Effect of Heat, we may observe, has been commonly called a Rarefaction of the Air; but I conceive it to be rather a Condensation; for if Air be contracted into a lesser Space, it must be more dense and pondrous: Did it dilate itself, it would have the contrary Effects to what

we

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we see, and must expel the cold Air instead of drawing it towards it. But I shall submit the Property of the Appellation, and according to the Reception of Things, call it, as often as I have occasion, Rarification.

We see the Result of Air always to a Fire, and its Motion is pretty strong through a narrow Hole or Passage, to a warm Room, as a small Stream must be swift to fill a large Evacuation. But this with regard to the Principle of Winds is answered in its Place.

The present Doctrine of Winds I have espoused as far as it offered itself to my Opinion by Reasons and Probability. The Satisfaction of being informed of the Mysteries and Operations of Nature, was
a what

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what actuated me in the Contemplation, and I should easily yield to any more certain Suggestions towards the Discovery.

The Matter is advanced as an Hypothesis, which depends on a Species of Reasoning, whose Conclusions cannot be made an absolute Truth, however they may gain our Judgment. A Probability may be carried to the greatest Length, and may approach infinitely near, but can never arrive to a Certainty or Demonstration. Upon this Foundation are most Parts of experimental Philosophy and Physicks; in which many things afford us a perfect Assurance and Conviction, that we dare not assert to be incapable of Contradiction. It is a natural Conclusion, according only to Appearances

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pearances and Observations, that the Sun is the Centre of the System of the World, and all the Planets roll, in Orbits round it ; but in that View the Tyconic might possibly be the true System, or a System that should place the Earth perfectly at rest in the Centre of the Motion, and all the other Part of that System which now prevails to move round it. This is confirmed to us by all visible Motions of the Planets, and it would be as impossible for us to determine which is the true System, as if a Man placed at Rest in the void Universe, and a Body moving in a right Line towards him, to know which is in Motion. There is nothing to be argued for the modern System (laying aside the Gravitation of Bodies) more than to reflect on the Design of the Work, and reconciling it to the Disposition of human

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Minds in framing and judging of a Fabrick or Constitution : We take it for granted, that the Cause that produced the Universe must have the same Understanding and Senses with us ; such Motions would not be given as our undefined Judgments determine to be needless, or a Uniformity be destroyed that strikes the Imagination, which is as great a Mystery to us as this preposterous System would be.

It is not demonstrated, that the Planets gravitate to the Sun: There may be a dark invisible Body to every Planet moving in a correspondent Orbit that shall carry it always in direct Opposition to the Planet with relation to the Sun. These shall keep each other in their Orbits, by Gravitation, in the same manner as the Motions are established between the
Earth

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Earth and Moon without any Action of Gravity in the Sun. All Objections of Centripetal Force are removed, because we know not what may be the real Density of any of the Planets.

We judge negatively in a Theorick Proposition. It is proved by solving such Difficulties as would contradict any other, which is the removing of what Objections fall in the way. It is therefore true only upon the Supposition that there can be no other Objections than what are considered, which can never be demonstrated. The Ptolomaick System prevailed in the World for many Ages, and Astronomers and Philosophers were well satisfied of the Truth thereof, perhaps equal to us of the Copernican and Newtonian System. That subsisted as long as no Contradictions

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traditions appeared: But when the matchless Newton discovered Difficulties of Gravitation and the Laws of Motion, all the former Schemes appeared absurd and inconsistent, which Men of excellent Reason and eminent Philosophers had adhered to.

If a Subject be copious and produces many Appearances, a Scheme that answers them all is remarkable; we reasonably judge, that when we perceive many Circumstances, there are the less concealed. Thus have we the greatest Confirmation possible of Sir Isaac Newton's System, because it accounts for such a Variety of Cases relating to Gravity and Motion. A Mystery that reveals to us but few Appearances, is hard to be discovered: It sometimes admits of a double Interpretation,

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tation, we therefore depend less on the Hypothesis that solves it.

In this Theory I have carefully proceeded to draw natural Conclusions, and have examined all the Phænomena I am acquainted with that concern the Thesis. There are various Observations to be made of the Winds, and if a Proposition could be made fully to explain them all, it would go far toward establishing the Discovery. It can scarcely be attempted to make any Estimation of the Winds that happen round the World in the Revolution of a Year, or propose any constant Motion of the whole Atmosphere that shall be equal to the Summary of its Motions by Winds : We cannot therefore compare the Effects of any conjectured Cause that may be computed, to find if it be sufficient to answer for them.

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them. For this Reason I have been obliged to submit this Part, with the best Helps I can make, to the general Judgment.

The Enquiry into the Progress of Vapours, has led me to take notice of the Productions of some other Appearances : I have intimated the Generation of Rain from condensed Vapours, which has been generally understood to fall immediately as soon as they were condensed, or the Bubbles of the Vapours broke ; the Rise of the Humidity of the Air ; Winter Fogs, of the Rime in Hoar Frosts, and have mentioned Snow. We might proceed farther upon each of these Topicks, but to unravel Particulars would form a Subject to itself, and be here an unnatural Digression.

A
T H E O R Y
O F T H E
W I N D S, &c.

THE *Wind* or Current of the Air is so common and familiar a *Phænomenon* in Nature, that a true Knowledge of its *Causes* cannot but afford us a grateful Satisfaction. But whatever Speculations have been advanced by many Learned and Ingenious Men, in order to account for the Productions thereof in some Measure, or for some particular *Breezes*

or constant *Winds*, yet we are at a Loss to determine from whence do arise the Agitations of the Air in general, or to assign the *Causes* of the violent Motions, and alterable Courses of it: For the Heat of the *Sun*, which some have supposed to be an Agent herein, by rarifying certain Parts of the *Atmosphere*, cannot be imagined to produce a *Storm*, or occasion the sudden Generation of a great *Wind*: Nor could we expect upon this Supposition the same *Winds* in the Night, when the Sun is absent, as the Day; or that there should be any *Winds* in those great Latitudes of the Earth, where, in the Winter, there is scarce a sensible difference of the Sun's Heat in the Day, more than in the Night; whereas there are more

Winds

Winds found to be in these Parts than in hotter Climates, and are greatest in the Winter. Besides these are many other Objections that subvert the Probability of this *Rise of Winds*.

To trace out the *Causes* of this *Meteor* by Effects and *Phænomena*, we may observe, that it is generally attended with a cloudy Sky, and that there are more *Winds* in the Winter, when there is more Rain and obscure Weather, than in the Summer, and likewise in our Northerly Climates than in lesser Latitudes that are more used to a Fair and Serene *Atmosphere*; which makes it probable, that the aqueous *Vapours* that are sustained by the Air, from whence come Clouds and Rains, may be the Foundation of

Winds. We shall therefore enquire if they may not be owing to the *Exhalation* and *Condensation* of these *Vapours*; that is, by the *Expulsion* of Air from some Place, by their *Accession*, or on the other Hand, by the Application of Air, to replenish the *Evacuations* that are made by their *Ab-solution* or *Condensation*.

It appears past all Dispute, that there is always a vast quantity of *Vapours* contained in the *Atmosphere*, if we consider how much Water is constantly discharged from thence in Rain and other Precipitations, and also that Curious Estimation Dr. *Halley* has given us of the exceeding quantity of Water wasted in *Vapours*, by the Surface of the *Seas* and *Rivers* in the World,

World, and diffused in the *Atmosphere*.

Now Water is known to have a very great Expansion in Vapours; so that every cubick Inch reduced to Vapours, does exclude as much Air as the quantity of Steam or Vapours it will produce; and on the contrary, if these Vapours be exempt of included Air, the Condensation of what appertains to every cubick Inch of Water, does leave as great a *Vacuum* as is the difference between the Spaces taken up by evaporated and natural Water: But that Vapours are empty, and their Expansion is not made by Air inclosed in the small Particles which constitute them, is evident by those Engines that are contrived for raising of Water by means

means of Steam: For the Condensation of the Steam or Vapours causes a *Vacuum*, which gives room to the Pressure of the *Atmosphere*, to act as a Power for working the Machine, of which we have a conspicuous Specimen in the Engine at *York-Buildings* in *London*.

Nor is it possible upon the Principles of Nature that have been hitherto discovered, that Vapours could ascend in the Medium of the Air if their expanded Particles were filled by the same Fluid: For then the Weight of the Water, together with that of the included Air, would render each Particle or *Vesicula* specifically heavier than Air of its self, and it must of consequence sink, unless obstructed
by

by some Cause different from that of Gravity. It is therefore necessary that Vapours be exhausted to acquire a bulk that shall make them lighter than Air in order to swim therein.

The following Experiment does farther prove, that Vapours are not filled by Air, and likewise shews the great extent which Water occupies in Vapours.

With two circular Boards of about 10 Inches Diameter, I caused a Belows to be made, which being filled, represented a Cylinder $10\frac{1}{2}$ Inches in Height. Over a Hole in the Centre of one of the Boards, I fixed a Pipe of $1\frac{1}{2}$ Inches Diameter; as is seen in the *Figure* at C. The end of this Pipe
shuts

shuts at *B*, into a Socket belonging to Vessel *A*, by which means there is made a Communication between the Inside of the Bellows and of this Vessel. *D* is a little Pin which being turned round, stops the Pipe *C B* by a small Board that moves over it in the Inside of the Bellows. The Wire *E* in the same manner is to stop the Socket of the Vessel *A*.

In the Vessel I poured a certain quantity of boiling Water, which together with the Vessel weighed $25\frac{1}{4}$ Ounces Troy, and then having compressed the Bellows, and brought the two Boards close, I fixed to it the Vessel, binding some Leather fast over the part at *B* where they joined, to prevent a Communication with the exterior

exterior Air. This Vessel was set over a Fire and the Water contained therein, made to boil violently, the Steam whereof did immediately swell the Bellows, and in a small time quite filled it. Hereupon I stoped the Vessel, by turning the Wire E, and separating it from the Bellows, found it weighed $24 \frac{1}{2}$ Ounces; that is, it had lost $\frac{3}{4}$ Ounce of its former Weight. The Content of the Bellows is 824, 25 cubical Inches, but allowing for the Separation of the Boards when compressed, which were an Inch distant, the Quantity of Vapours therein was but 745, 75 cubical Inches.

The Parts of this *Apparatus* being made so close, that no Air could insinuate itself from without, it is certain, that whatever Air was previously

included in the Vessel, and Bellows, the Vapours which arose from $\frac{3}{4}$ Ounce or 1, 42 cubical Inch of Water, filled 745, 75 Inches without the help of any Air: Besides the Experiment being repeated and the Bellows filled, it was removed from the Fire to a cool Place, where the Vapours condensing, the Bellows was depressed, by the Weight of the *Atmosphere*, till quite exhausted, which could not have happened unless the Vapours were devoid of Air; for otherwise that which they must have emptied would have supported the Bellows. We might therefore venture to conclude, that Vapours are made up of small excavated Globules of Water which owe their Inflation only to Heat; and it seems confirmed by their Absolution by Cold.

In

In this Experiment 1, 42 cubical Inch of Water, filled 745, 75 Inches with Steam; but if we account for what was condensed on the sides within the Bellows before the Steam raised it to its greatest Height, the Produce of Steam is much greater. In order to estimate it, I made the Experiment once more, and as soon as the Bellows was full, immediately separated it from the Vessel, and forced all the Steam out. I then weighed the Bellows and found it to be 270 Grains heavier than before the Experiment. This subtracted from $\frac{3}{4}$ Ounce or 360 Grains, the Remainder is 90 Grains, which is what was really contained in Vapours within the Bellows. 90 Grains to produce 745, 75 cubical Inches, is after the rate of

C 2 1 Inch

1 Inch of Water to fill 2100, 6 Inches of Steam or Vapours, according to the specifick Weight of Water. If this Experiment be defective, it has made the Produce of Steam too little. It has been asserted, but by what Experiment I know not, that an Inch of Water makes 13000 Inches of Steam.

All the Water then which falls in Rain, Snow, &c. possessed 2100, 6, or say 2000 times the Space when it floated in the Atmosphere in Vapours; and the Condensation thereof must occasion Vacuums, which collected would be a Space 2000 times greater than what is taken up by it in Water, which will put the surrounding Air in no small Motion to restore so considerable a Deficiency.

And

And did we know the Quantity of Vapours that were condensed in a given Time over a known Extent of the Surface of the Earth, we should deduce how great a Rarification was made in that Time in the Atmosphere, and thereby be able to estimate the Celerity of the circum-adjacent Air, or how great a *Wind* was generated in all the Parts round that Place.

It is not at all improbable, that there is often assembled in the Atmosphere, a sufficient Quantity of Vapours to maintain a lasting Condensation, and that it is also quick enough at some times to create a great *Wind*: For some Rains we are accustomed to, are sufficient to make a small Motion of the
Air,

Air, were the Vapours to condense no faster than the absolved Particles discharge themselves by that Means; but it seems very evident to be much faster; for when any Part of the congregated Body of Vapours arrive to a state of Coldness fit to condense them, it will be supposed the Condensation does quickly spread it self throughout the whole misty Region. How it is that the aqueous Atoms are not precipitated immediately upon their Conversion from Vapours, is thus. Vapours being detached from Water in some warm Climate, they ascend in the Air till they acquire a certain Height where they are suspended, by their specifick Gravity, and the Viscousness of the cold Air in those superior Parts of the Atmosphere that are remote from the

Reflection

Reflection of the Earth. Here they remain till, by the Accumulation of two contrary Winds meeting at that Place, they are farther raised to a Region cold enough to condense them; or else they are removed, by a Current of the Air, to some cold Parts or Climates of the Earth where they are condensed. The Particles of Vapours being absolved into Particles of Water, they become exceedingly less, and are unable to overcome the Cohesion of the Parts of the Air for to descend: For tho' Water is exceedingly greater in its specifick Weight than Air, and Air is more rarified the greater is its distance from the Earth; yet it has been shewn by Mr. *Mollyneux* to the *Royal Society*, that there is so great a Power of Union between the Parts of some
Liquids

Liquids, as to suspend dissolved Bodies that are far heavier, and that *Mercury* will swim in Spirits of *Nitre*: For the cohesive Power of the Liquid is to be considered according to the Surface of the suspended Body, and the Gravity acting against it, as the Body's Solidity; and there being a lesser Proportion in the Decrease of Bodies in their Surface than in their Bulk, a Body may be of that Minuteness, as to swim in the most subtle Fluid that has any determinate Cohesion.

Air is known to be a tenacious Fluid, and there is a greater Cohesion in its Parts the more frigid it is; the Atoms which proceed from Vapours are also infinitely small, for they are imperceptible while inflated Bubbles in
Vapours,

Vapours, and being reduced to Water are 2000 times less according to our Computation. There is therefore no room to doubt, but that Vapours may be retained in the Air some time after their Condensation.

And it seems confirmed by Observation: For we may ascribe to these unprecipitated Atoms of Water, the Humidity of the Air, and that very moist and thick Weather that we sometimes have, when the floating Atoms roving up and down by the Agitations of the Air, alights on our Walls, Floors, Windows, and such like Places; which we find very frequently in the Winter Seasons, especially in the Night; for the extraordinary Cold thereof does in a great Measure condense those Va-

D

pours

pours that are raised by the Sun and Wind in the preceding Day, which for want of Time, or by the Resistance of the cold Air, are prevented from rising high ; wherefore we see the Glass of Windows covered by Mists, at least on the Inside, for the Wind dries the Outside as fast as they gather.

To this is owing the Dilatation and Contraction of the *Hygrometer*, the Water imbibed by calcined *Salt-petre*, and also the Dews of the Summer, which are derived from the Vapours extracted by the intense Heat of the Day, and condensed in the Night.

In the Winter when the Air is disposed for freezing, it is not unlikely, that the Atoms that harbour next the
Earth

Earth are congealed, whereby they become more opake, and constitutes those obscure Fogs which always attend a hoar Frost; and it is confirmed by the Rime, which I take to be these frozen Atoms dispersing themselves in the same manner as the humid. They no doubt are also in the higher Parts of the Atmosphere; and it is not absurd to think, that upon them depends the Generation of *Snow*.

But the condensed Vapours are very copious on the Tops of high Hills and Mountains, which extend themselves to the Clouds, or to the Regions where the Vapours exhaled by the Earth do chiefly reside. This Dr. *Halley*, in his *Account of Vapours*, has given us an Instance, who found Mists

to gather exceeding fast on the Hills of *St. Helena*. Vapours then still swimming in the Air after their Condensation, I suppose they remain till by the Alteration of the state of the Atmosphere, or by their Transposition by Winds, they become more accumulated, and the Atoms approach each other so near as to incorporate, whereby having acquired a size large enough to overcome the Tenacity of the Air, they descend, and in their way perhaps meet many others which add to their Bulk, till at length they fall to the Earth in Drops of Rain faster or slower. When they are of a Quantity, and in a condition to concrete very fast, they make a great Rain, otherwise it is in a slow or moderate Degree.

Hence

Hence we might observe, that there is a Distinction to be understood with respect to Vapours, between Condensation and Concretion: Condensation is the Dissolution of the small Bubbles or *Vesiculæ*; Concretion is the uniting of the Atoms after Condensation.

Since therefore we are not to compute the Condensation of Vapours by any Rain that falls, but may believe they can be condensed quick enough to cause a *Wind* of any Intensity; we are next to enquire, whether the Earth do not supply the Atmosphere with sufficient Quantities of Vapours to account for all the *Winds* throughout the World.

This

This will not appear a Difficulty, if we attentively consider the Quantities emptied in Rain, Snow, Hail, &c. and what a great Part of the aqueous Load of the Atmosphere is never precipitated this way, but spent in a sort of Dew before the condensed Mists or Clouds are prepared for Rain, or any other Precipitation, which is received in so great a Measure by high Land and Ridges, that Dr. *Halley* ascribes to it the Rise of Springs, of great Currents, the Repletion of Seas, &c. We may likewise judge by the Barometer of the Vapours sustained by the Atmosphere, which sometimes in a sensible Measure augments the Weight thereof. This is a very considerable Proof if we consider farther, that at
the

the lowest Degree of the *Mercury*, the Atmosphere is without doubt much heavier than if it was a pure homogeneous Fluid.

But to adhere only to the Estimation Dr. *Halley* has given us of the Vapours raised by the Heat of the Sun, we shall find an immense Quantity is constantly remitted from the Earth to the Atmosphere: For according to an Experiment made by him, a Heat equal to that of our Air in a hot Summer (which may be taken for a mean Heat of the Sun with regard to the whole Earth) extracts 33 Millions of Tons of Water every Day in Vapours from a square Degree. Suppose $\frac{3}{4}$ of the Surface of the Globe to consist in Seas, Rivers, and other Waters,

ters, which is not too great a Proportion as far as we have a Knowledge of it: The Circumference is 360 Degrees, and 4 times the Area of that Circumference or Circle is the Area of its Superficies 11314,9 square Degrees: $\frac{3}{4}$ of this is 8486,175 Degrees the Area of the Waters, which multiplied by 33 Millions, gives 285 Thousand and 43 Millions, 775 thousand Tons of Water drawn from the Surface of the Earth in one Day. This will fill 64,781 cubical Miles, which being multiplied by 2000, is 129861 Miles, the Space it will take up in Vapours, from whence subtract 64,781, the Remainder is 129796,219 cubical Miles of the Atmosphere filled by Vapours every Day.

This

This prodigious Quantity being divided and aranged in Bodies at various Situations throughout the World, occasions by the mutual Condensations, almost constant Results of the Air to supply the empty Places, and I believe it will be thought abundantly sufficient for producing and maintaining all *Winds* universally, especially if we consider with Dr. *Halley*, what unknown Quantities of Vapours are raised by the *Winds*, and likewise, that the great and variable *Winds* do not extend all over the World, but seem rather confined only to those Quarters towards the *Poles*: For in those Countries which approach the *Æquator*, there is known to be generally a hot settled Air, and the *Winds* (whenever

E

they

they are favoured with them) are no more than flow Breezes. As for the incessant Current of the trade *Winds*, they are a peculiar Consideration; and seem to be built on other Principles than the Condensation of Vapours.

And because the Circles of the Earth decrease as they advance in Latitude, these Spaces where the *Winds* are chiefly seated, contain but a small Portion of the whole Atmosphere, and therefore a less Quantity of Vapours is required to supply them.

Thus far have we treated of what relates to the Condensation of Vapours; but it will be supposed, that upon the same *Hypothesis*, their Accession to the Atmosphere will also cause a Motion therein

therein by driving the Air from the Place they occupy. Herein we are to observe, that the Evaporations of the Earth are unbounded throughout the Hemisphere next the Sun, and what Vapours occur to any one Place, do every where resist the Incursion of the ampulated Air from the neighbouring Place; and tho' the Earth do more profusely emit its Vapours where it is in the vertical Heat of the Sun, yet the Air by the greater Heat there, is more rarified, whereby it makes room for admitting a greater Quantity of Vapours; and so if we proceed from the *Zenith* to the *Horizon*, we shall find, that as the Emission of Vapours decreases according to the Heat of the Sun, it supplies the Rarification which decreases in the same manner. Thus

the Air of that side of the Earth towards the Sun, is opposed from flowing in on the contrary Hemisphere, by the augmented Resistance the latter receives by being condensed by the Cold of the Sun's Absence.

But considering how great is the Expansion of Vapours, and that they are emitted incessantly, we may believe they do more than balance the Rarification made by the Sun's Heat, and swelling the Atmosphere occasions a Motion to the attenuated Parts, and has frequent Recourses to Land which produces less Vapours; whence it is likely those Breezes come which are felt on Shores open to the Seas, and have the name given them of *Sea Breezes*.

There

There are also the reverse of these Winds which we might enquire into, that blow from the Land, and are known to Seamen at their approaching it, by whom they are called *Land Breezes*. These may possibly proceed from the extraordinary Heat of the Sun, by the Reflection of the Soil, which causes the Sea that is next the Land to evaporate more copiously than do the remote Ocean, which is incapable of such a Reflection. Hereby the Air is driven towards the Sea to restore an Equilibrium. But to undertake the perfect Solution of these *Phenomena*, it is necessary to be acquainted with the Situation of the Country, how it is laid out in Lands and Rivers, and the Texture of the Soil

Soil both for Reflection and Evaporation.

From hence therefore the Production of Winds depend chiefly on the Condensation of Vapours. We shall proceed to explain the several Properties and Cases that are solvable thereby, which is not only what is requisite, but will also be a Confirmation to the *Hypothesis*.

1. The Direction or Course of any Wind, is according to the Situation of the Body of Vapours, whose Condensation produces it; so if a Concourse of Vapours be gathered over the Kingdom of *France*, the Condensation thereof would draw the Air from *England* in a Southerly Direction, in
Spain

Spain would be a Northerly Wind, in *Germany* it would blow Westerly, at the *Bay of Biscay* an Easterly Wind. And when this Condensation is extinct, should another fall out over *Norway*, the Southerly Wind in *England* would be changed into a North-West, the Wind in *Germany* to Northerly, and so in the other Countries as they are posited. The Course of a Wind may also proceed from a compound Cause, as there may be a Condensation over *France* and *Norway* at the same time, which would make a South-Easterly Wind in *England*.

2. The Force or Intensity of a Wind is as the Extension of the condensing Vapours, and the Quickness of their Condensation. A Wind is also
en-

increased by a Composition of Condensations in divers Parts, it being acted upon by each; some Circumstances in which may create an extraordinary Celerity of the Air: As for Instance; at a Place that is between any two Condensations, the Air is doubly attenuated by a double Action, and the Result of other Air to supply this at the Avenues to it, will be much greater than what flows to the Condensations themselves. These Things being duly examined, with the possible Quickness of Condensation, and the Concurrence of rising Vapours, we might venture to proceed to the Case of a *Hurricane*.

3. How it comes to pass, that there are more *Winds* about the *Æquinoxes*

quinoxes than at other Seasons, may arise from this : The Sun at those Times being in the *Æquinoctial*, it passes over a greater Circle of the Earth than at any time before or after, when it is declined to the Tropicks, and by its vertical Heat, does raise a greater Quantity of Vapours, the Condensation whereof must produce the more Winds. It is likewise probable, that at the *Æquator* the Sun's Heat is more retained than in all other Places of the Globe; for its Recess is least from that Circle, and it crosses it twice every Year; so that at its approaching there is a greater Evaporation made than if the Climate, by a long Absence, must be acted upon some time before it arrives to its greatest Degree of Heat,

in which the Waters are most volatile.

4. It is understood, that the greater Quantities of Rain that fall in the Winter, must occasion more Winds than in the Summer there being a proportionable Quantity of Vapours condensed; and likewise,

5. That there are more Winds in distant Latitudes than towards the *Æquator*, because the former are more subject to Rains.

But we shall beg leave to make a small Digression to enquire into the particular Reasons of some paradoxical *Phænomena* in these two last Cases, which requiring the help of some new Theory

Theory may be a Confirmation to this;
that is,

6. Why there is more Rain and Wind in the Winter than in the Summer; when the Heat of the Sun in the former is more weak and languid, by which it is incapable of raising any great Quantity of Vapours to produce that Rain and Wind.

In the Solution hereof, it is to be observed, that the Quantity of Vapours extracted from the whole Earth by the Sun, is the same in the Winter as in the Summer; for if at any Place the Sun's Heat is diminished, it is as much increased with the *Antiæci* of that Place. The Exhalations of Vapours grow less according to the Heat

of the Sun, which is proportionable to the Latitude. The Vapours then that are raised in the greatest Plenty about the *Æquator*, or between the Tropicks, being forced from their Places, by the continual Accession of new Vapours, to the less crouded Parts towards the Poles, are condensed upon their Arrival at those distant Climates which retain a state of Coldness sufficient for that Purpose. They are also carried by the Winds that ensue upon these Condensations. But the cold Temperature of the Air of that Side the *Æquator* where it is Winter condenses the Vapours very plentifully, and consequently there are more do fly with the Current of the Air to supply these than to the opposite side of the World where

where the Summer reigns, the Heat whereof dissipates the Coldness necessary for condensing of Vapours. If there be a greater Quantity of Vapours condensed, there must be the greater quantity Rain and Wind, which holds reciprocally between the Winters and Summers of each Side the *Æquator*.

From hence we perceive,

6. Why we have more Rain and Wind towards the Poles than about the *Æquator*, altho' the latter is a part of the World where the Sun makes the greatest Evaporations.

I doubt not but there may be many other Circumstances than these relating to the Winds; some that are remarkable and peculiar in various Countries

Countries and Situations of the Earth, which has escaped the Notice of any published Relations or History; a compleat Account hereof might perhaps furnish us with Instances enough to confirm this Theory past all Contest. It would therefore be worthy of a curious Mind, that is well informed herein, to try the Solution of any farther Phænomena upon the Hypothesis, in order to establish a Matter which will further our Discoveries a considerable step in the Progress of Nature; we may be thereby satisfied of the Causes of a Meteor, that has subsisted in equal Duration with the World, and we may believe, has been as long a Secret.

F I N I S.